

No. 722,968.

PATENTED MAR. 17, 1903.

B. GASTAL.
AIR COMPRESSOR.

APPLICATION FILED DEC. 24, 1900. RENEWED FEB. 12, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

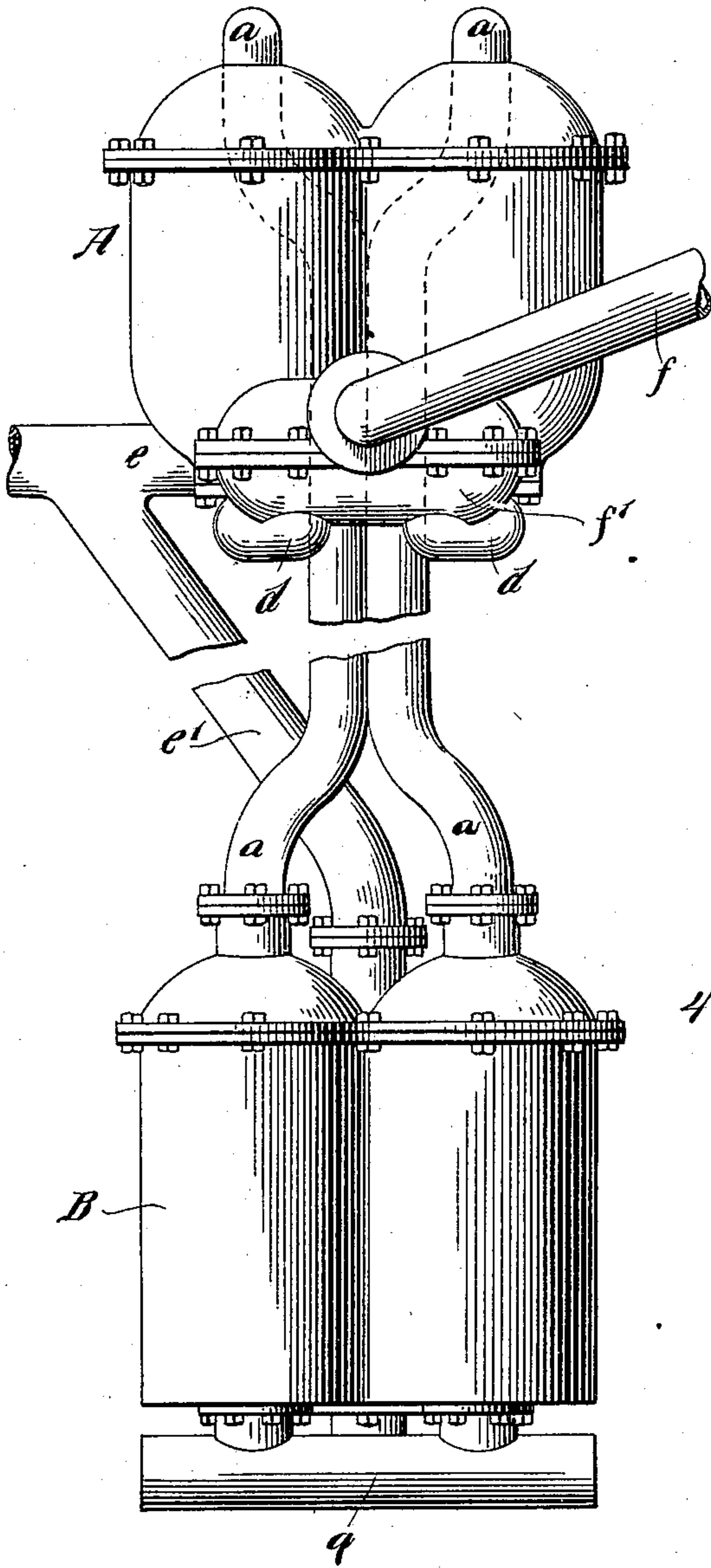


Fig. 2.

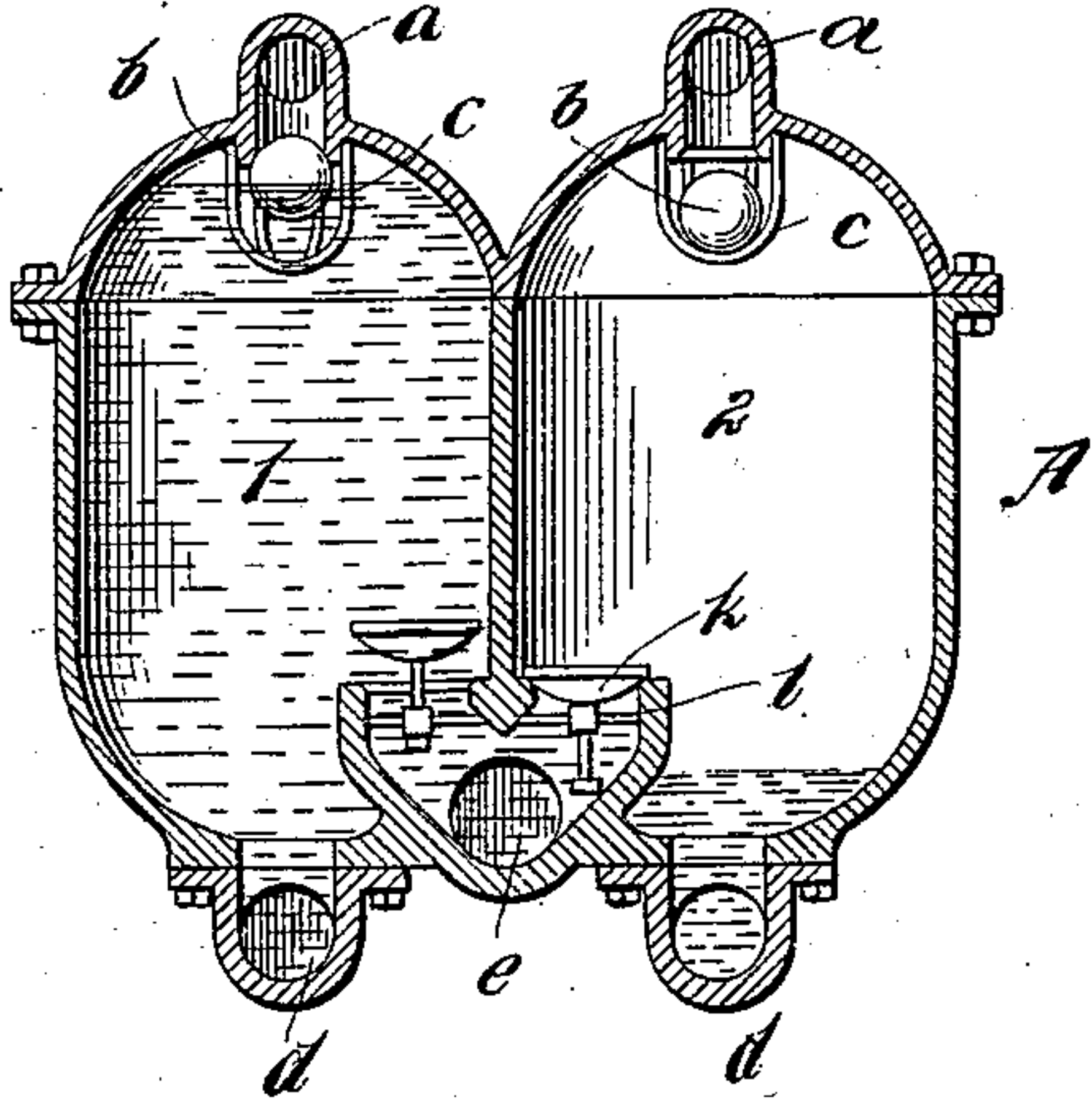
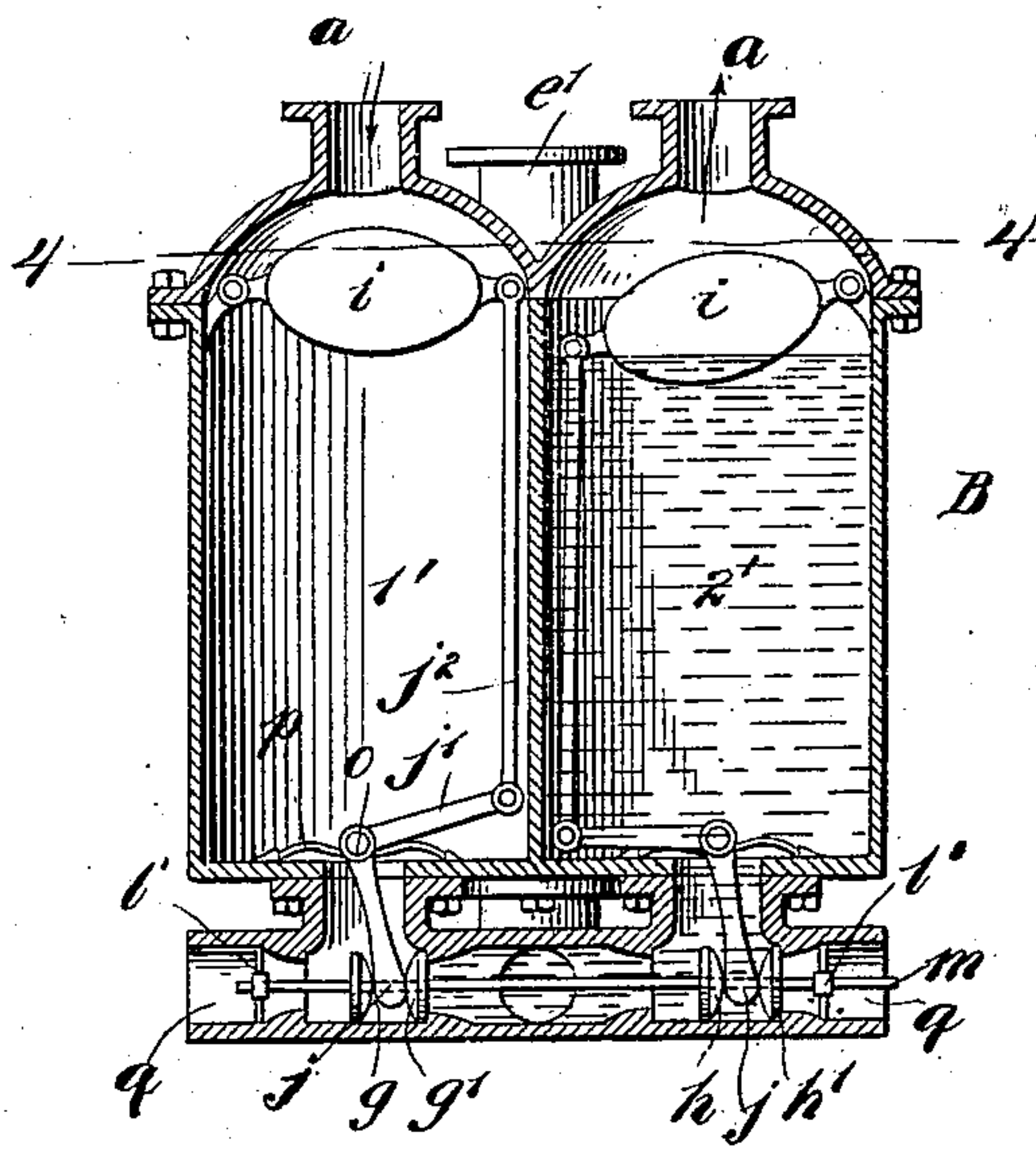


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

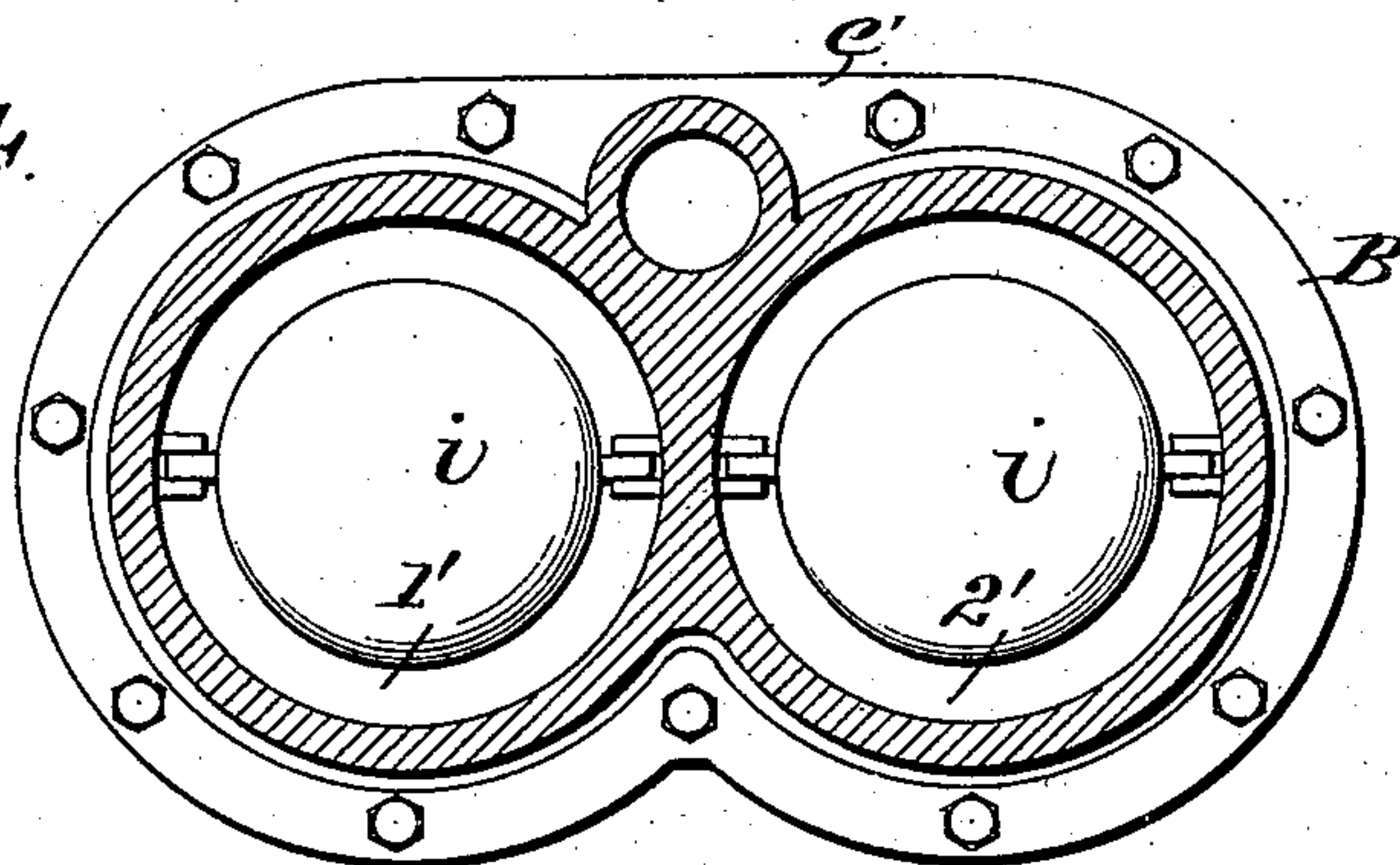


Fig. 5.

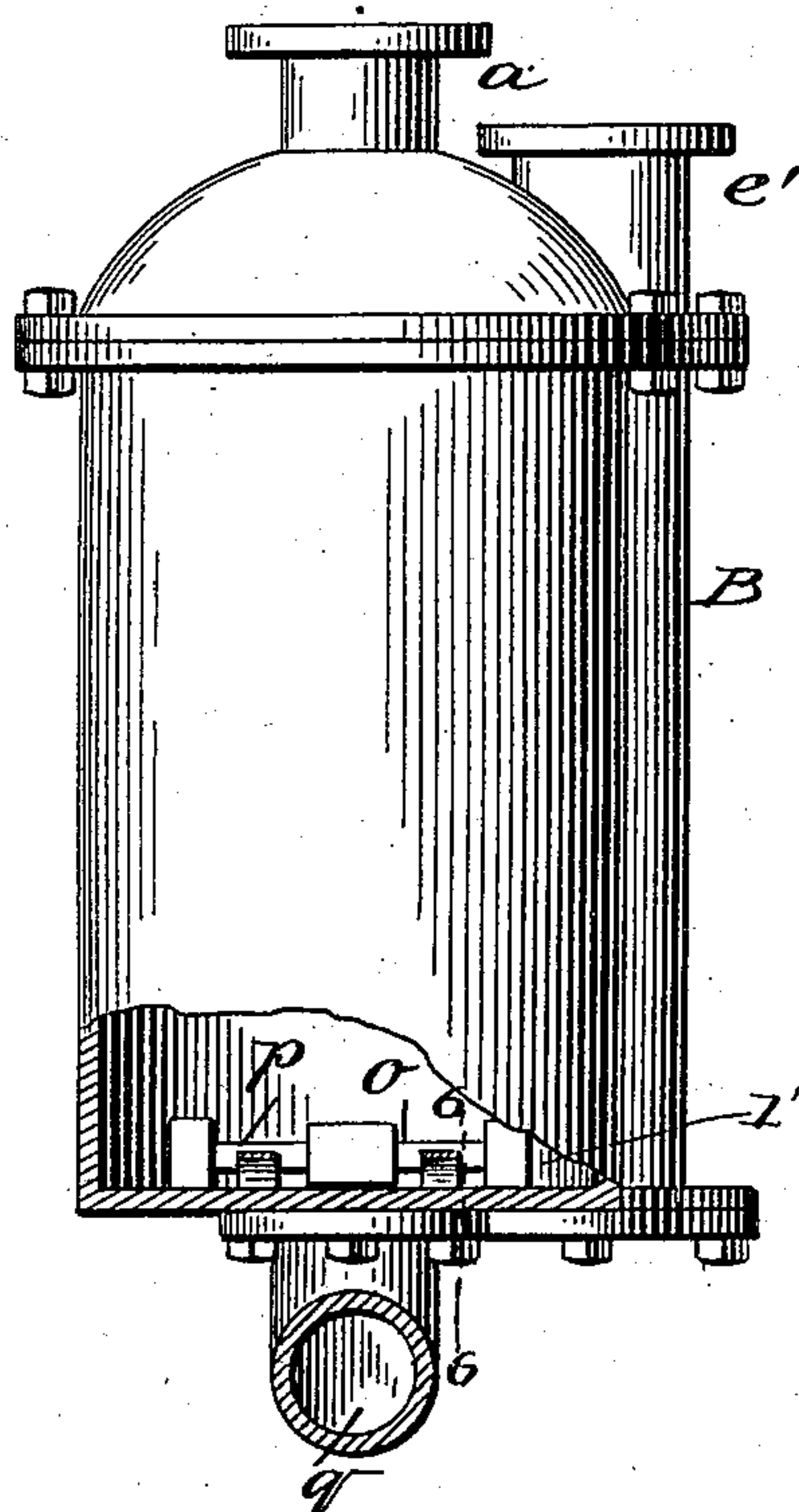
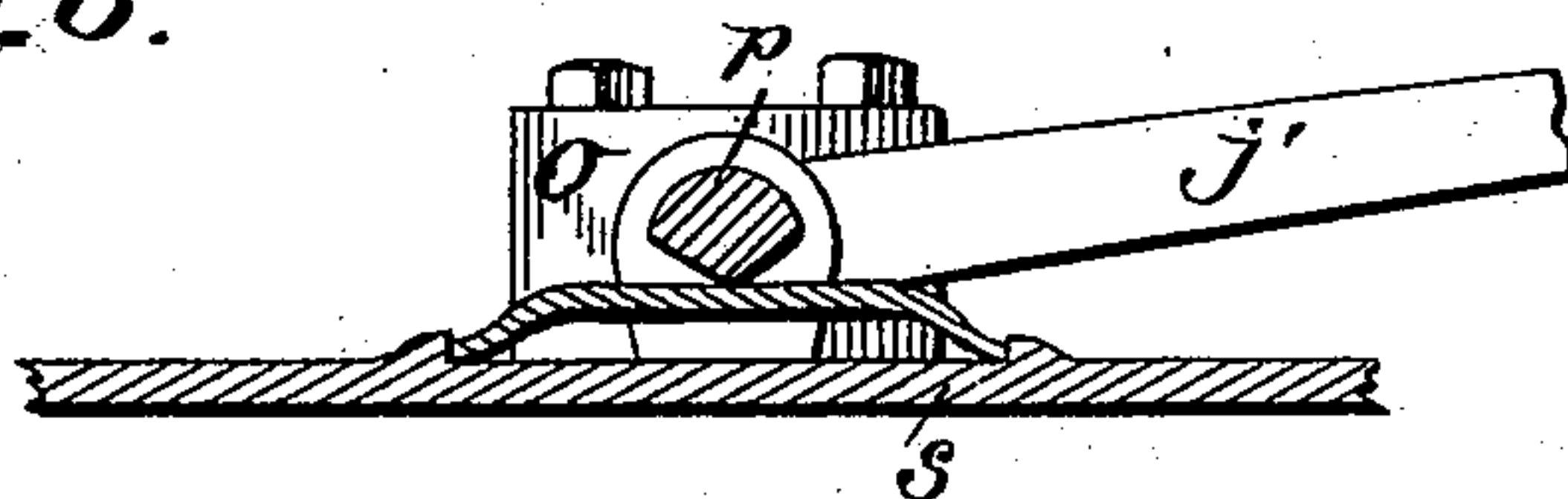


Fig. 6.



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BENJAMIN GASTAL, OF PELOTAS, BRAZIL.

AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 722,968, dated March 17, 1903.

Application filed December 24, 1900 Renewed February 12, 1903. Serial No. 143,145. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN GASTAL, a citizen of the United States of Brazil, and a resident of Pelotas, in the Province of Rio Grande do Sul, Brazil, have invented certain new and useful Improvements in Air-Compressors, of which the following is a full, clear, and exact description.

My invention relates to devices for compressing air; and the object of my invention is to provide a simple and efficient automatic device of the above-indicated class.

The invention will be fully described hereinafter and the features of novelty pointed out in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is an elevation of the improvement. Figs. 2 and 3 are sectional elevations of the upper and lower casings or cylinders, respectively. Fig. 4 is a sectional plan of the lower casing or cylinder on line 4 4 of Fig. 3. Fig. 5 is a side elevation of the same with parts in section, and Fig. 6 is a detail sectional elevation on line 6 6 of Fig. 5.

In the drawings, A and B represent two casings or cylinders to which water under pressure is conveyed by pipes *e e'*, a delivery-pipe *f* being shown leading from the casing or cylinder A. The upper casing A is divided into two chambers or compartments 1 and 2. At the bottom is the water-inlet *e*, the communication of which with the respective chambers is controlled by inwardly-opening valves *k*, having guided movement in blocks *l*. Each chamber has at its bottom an outlet *d*, connected with the delivery-pipe *f*, a check-valve (not shown) being located in the connection, and at the top an air-inlet pipe *a*, connected with the top of the corresponding chamber 1' or 2' of the lower casing B. An inwardly-opening valve *b*, held in a cage *c*, controls the passage of air from the pipes *a* to the chambers 1 and 2. The lower casing B, as before stated, communicates at the top with the pipes *a a*. It is divided into two chambers 1' and 2', each of which in its upper portion contains a pivoted float *i*, connected by a rod *j*² with the arm *j'* of a shift-

ing-lever *j*, fulcrumed at *o*. Preferably the lever is formed at its fulcrum with a knife-edge, against which pressspring-plates *p*, held in the bottom *s*. (See Fig. 6.) Thus the shifting-lever will be thrown quickly each time it passes its central position. The lower end of each lever *j* fits on a sliding rod *m* between two valves *g g'* and *h h'*, respectively. The rod *m* is guided by blocks *l'*. The water-inlet *e'* is located between the valves *g'* and *h*, which are so spaced relatively to their seats that when one valve is seated the other will be open, allowing the inlet *e'* to communicate with one of the chambers 1' 2'. The valves *g h'* control the communication of the chambers 1' 2', respectively, with outlets *q*.

The operation is as follows: Supposing the parts to be in the position shown in Fig. 3, water passing through the pipes *e e'* will pass into the chamber 1 of the casing A and into the chamber 2' of the lower casing B. The water will gradually fill the chamber 1, driving out the air therefrom through the pipe *a* at the top, the chamber 1' of the lower casing, and the outlet *q* at the left. At the same time the chamber 2' becomes filled until the float *i* is operated to throw the shifting-lever *j* and the valves *g g' h h'* into the reverse position to that shown in Fig. 3. The outlet *q* being thus disconnected from the chamber 1', the entrance of water from the pipe *e* to the chamber 1 is interrupted, while water passes into the chamber 2, driving the air therefrom through the pipe *a* into the chamber 2', which now is open to its outlet *q*. Thus the water previously admitted into the chamber 2' will escape. At the same time water rushes into the chamber 1' and drives the air therefrom through the pipe *a* into the chamber 1, which is filled with water from the previous operation. When the water reaches the top of the chamber 1', the float is operated to again reverse the position of the valves of the lower casing B and at the same time brings the float *i* in the other chamber 2' into the lower position. The operation is then repeated, the air being forced alternately from the chambers 1' and 2' into the chambers 1 and 2, while some water escapes alternately from the chambers 1' and 2'. As these latter are at a lower level than the chambers 1 and 2, the

water has a greater pressure in the lower casing B than in the upper casing A.

The pressure-pipes *e e'* may be connected with any suitable water-supply, as a tank, 5 into which water is conducted, or they may be connected with a water-main.

Various modifications may be made without departing from the nature of my invention.

10 Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of two casings or chambers each having an air-passage at the top, a 15 liquid-passage at the bottom, a liquid-inlet adapted to communicate with said liquid-passages, and two liquid-outlets adapted to communicate with the respective liquid-passages, a float located in each casing and pivoted at 20 one end to a fixed part of the casing, a set of connected valves controlling the connection of said liquid-passages with the respective outlets and with the inlet, a shifting-lever fulcrumed in the lower part of each chamber, 25 a rod connecting the other end of each float with an arm on the shifting-lever, the said levers being operated by the floats and arranged to actuate the valves, and a spring for throwing each lever quickly when it passes 30 its central position.

2. The combination of two casings or chambers each having an air-passage at the top, a liquid-passage at the bottom, a liquid-inlet, 35 and two liquid-outlets adapted to communicate with said liquid-passages of the casings, a float located in each casing and pivotally connected at one end thereto, a set of rigidly-connected valves controlling the connection of said liquid-passages with the respective 40 outlet and inlet, a shifting-lever operated by each float and arranged to actuate said valves, each of said levers being provided with a knife-edge at its fulcrum, and a spring-plate held in each casing or chamber, each spring- 45 plate having its ends engaging the bottom of the casing and its central portion engaging the lever at said knife-edge to throw the le-

ver quickly when it passes a predetermined position.

3. The combination of two casings or chambers each having an air-passage at the top, a liquid-passage at the bottom, a liquid-inlet and two liquid-outlets adapted to communicate with said liquid-passages of the casings, 50 a float pivoted in the upper part of each casing, a rod mounted to slide, valves arranged in pairs and rigidly connected with said rod for controlling the connection of said liquid-passages with the respective outlets and inlet, and shifting-levers connected with the 55 sliding rod between the valves of each pair to operate the valves, the said levers being each positively connected with one of said floats, so that the floats will move in unison, the movement of one float being transmitted to 60 the other float through the medium of the valves and shifting-levers.

4. A device of the character described, comprising two casings or chambers each having a valve-controlled air-pipe leading from the 70 top thereof, a water-supply pipe connected with the chambers at the bottom, inlet-valves controlling the connection of said water-supply pipe with the respective chambers, liquid-outlets connected with the respective cham- 75 bers at the bottom, outlet-valves controlling the connections of said outlets with the respective chambers, the said inlet and outlet valves being on the same stem to move in unison, and so arranged that the inlet-valve 80 of one chamber and the outlet-valve of the other chamber will be closed at the same time, floats arranged in each of said chambers and operatively connected with the valves thereof, and chambers with which the said 85 air-pipes are connected and into which the air is discharged, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

BENJAMIN GASTAL.

Witnesses:

JOAS ABADIE,

ADOLPHO DE OLIVION.